

**DEPARTMENT OF MECHANICAL ENGINEERING**  
**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

<b>COURSE PLAN – PART I</b>			
<b>Name of the programme and specialization</b>	<b>B.Tech – Mechanical Engineering</b>		
<b>Course Title</b>	<b>Strength of Materials / Fluid Mechanics laboratory</b>		
<b>Course Code</b>	<b>MELR20</b>	<b>No. of Credits</b>	<b>2</b>
<b>Course Code of Pre-requisite subject(s)</b>			
<b>Session</b>	<b>July 2018</b>	<b>Section (if, applicable)</b>	<b>B</b>
<b>Name of Faculty</b>	<b>Dr.-Ing. Ashok Kumar Nallathambi</b>	<b>Department</b>	<b>Mechanical Engineering</b>
<b>Email</b>	<b>nashok@nitt.edu</b>	<b>Telephone No.</b>	<b>95003 10739</b>
<b>Name of Course Coordinator(s) (if, applicable)</b>			
<b>E-mail</b>		<b>Telephone No.</b>	
<b>Course Type</b>	<input checked="" type="checkbox"/> <b>Essential Lab Requirement</b>		
<b>Syllabus (approved in BoS)</b>			
<p><b>Strength of Materials - List of Experiments</b></p> <ol style="list-style-type: none"> <li>1. Tension test on mild steel rod</li> <li>2. Torsion test on mild steel rod</li> <li>3. Hardness test on metal beam (Rockwell and Brinell Hardness Tests)</li> <li>4. Compression test on helical spring</li> <li>5. Deflection test on simply supported beams</li> <li>6. Charpy Impact Test</li> </ol> <p><b>Fluid Mechanics - List of Experiments</b></p> <ol style="list-style-type: none"> <li>1. Flow through Venturi meter</li> <li>2. Flow through Orifice meter</li> <li>3. Characteristics of Centrifugal pumps</li> <li>4. Characteristics of Francis turbine</li> <li>5. Determination of major losses in pipes</li> <li>6. Determination of minor losses in pipes</li> </ol>			
<b>COURSE OBJECTIVES</b>			
<ol style="list-style-type: none"> <li>1. To study the mechanical properties of materials when subjected to different types of loading.</li> </ol>			

2. To verify the principles studied in Fluid Mechanics and turbomachines theory by performing experiments in lab.

**COURSE OUTCOMES (CO)**

<b>Course Outcomes</b>	<b>Aligned Programme Outcomes (PO)</b>
Upon completion of this course, the students will be able to:	
1. Perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.	<b>PO2, 4,9</b>
2. Use the measurement equipment for flow measurement.	<b>PO4</b>
3. Perform test on different fluid machinery.	<b>PO2, 4,9</b>

**COURSE PLAN – PART II**

**COURSE OVERVIEW**

Strength of materials lab course provides the students to get an insight into the mechanical behavior of different materials under various loading conditions. Measurement of the material characteristics like Young’s modulus Tensile strength, Hardness, Impact strength etc., will make the students to realize the application of these properties in design of machine components. From the Beam deflection test, and Torsion test one can differentiate geometric and material parameters which influences the bending and twisting effects.

In fluid mechanics lab, discharge of fluid (water) through various notches, bends, elbow enables them to have a comparative study based on the losses, frictional effects and so on. In addition to this, students are also being introduced to the hydraulic machines like pumps and turbines which is useful in understanding the efficiency of the machines with respect to the concerned applications.

**COURSE TEACHING AND LEARNING ACTIVITIES**

<b>S.No.</b>	<b>Week/Contact Hours</b>	<b>Topic</b>	<b>Mode of Delivery</b>
1	1 <sup>st</sup> Week( 2 and half hours)	Introduction of SoM and FM lab experiments	Oral
2	2nd week ( 2 and half hours)	Tensile testing of mild steel rod and Compression testing of concrete block	Demonstration
3	3 <sup>rd</sup> Week ( 2 and half hours)	Hardness test on metal plates (Rockwell and Brinell Hardness Tests)	Demonstration

4	4 <sup>th</sup> Week ( 2 and half hours)	Deflection test on open and close coiled spring	Demonstration
5	5 <sup>th</sup> Week ( 2 and half hours)	Torsion test on mild steel rod	Demonstration
6	6 <sup>th</sup> Week ( 2 and half hours)	Deflection test on simply supported beams	Demonstration
7	7 <sup>th</sup> Week ( 2 and half hours)	Flow through Venturi meter	Demonstration
8	8 <sup>th</sup> Week ( 2 and half hours)	Characteristics of Centrifugal pumps	Demonstration
9	9 <sup>th</sup> Week ( 2 and half hours)	Characteristics of Gear pump	Demonstration
10	10 <sup>th</sup> Week ( 2 and half hours)	Characteristics of Francis turbine	Demonstration
11	11 <sup>th</sup> Week ( 2 and half hours)	Determination of friction losses in pipes	Demonstration
12	12 <sup>th</sup> Week ( 2 and half hours)	Charpy impact test / Determination of Metacentric height	Demonstration
13	13 <sup>th</sup> Week ( 2 and half hours)	Final Exam for Strength Materials Lab (2 hours)	Demonstration
		Oral exam (half an hour)	
14	14 <sup>th</sup> Week ( 2 and half hours)	Final Exam for Fluid Mechanics Lab (2 hours)	Demonstration
		Oral exam (half an hour)	

**COURSE ASSESSMENT METHODS (shall range from 4 to 6)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Strength of materials lab final exam	13 / 16-10-2018	2 hrs	30%
2	Fluid mechanics lab final exam	14 / 23-10-2018	2 hrs	30%

5	Report for strength of materials lab	2-6		10%
4	Report for fluid mechanics lab	6-11		10%
5	Viva-voce for strength of materials lab	13	30 min	10%
6	Viva-voce for Fluid mechanics lab	14	30 min	10%
CPA	Compensation Assessment*			
7				
8	Final Assessment *	15 / 30-10-2018	2 hrs 30 min	40%

**\*mandatory; refer to guidelines on page 4**

**COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)**

1. Feedback from the students during class committee meeting.
2. End semester feedback on Course Outcomes.

**COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)**

**MODE OF CORRESPONDENCE (email/ phone etc)**

Per Email (nashok@nitt.edu)

**COMPENSATION ASSESSMENT POLICY**

Only one lab session will be permitted. Student needs to perform both SoM and FM lab with 2 hours 30 minutes' duration rather than regular 5 hours' period.

**ATTENDANCE POLICY** (A uniform attendance policy as specified below shall be followed)

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- **Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.**

**ACADEMIC DISHONESTY & PLAGIARISM**

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying

from others during an assessment will be treated as punishable dishonesty.

- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

#### **ADDITIONAL INFORMATION**

Individual Lab experiment report should be submitted within 14 days from the date of experiment completion. Each report should not exceed more than 6 pages and should contain minimum 4 pages. Group report is sufficient rather than individual report.

#### **FOR APPROVAL**

Course Faculty \_\_\_\_\_ CC-Chairperson \_\_\_\_\_ HOD \_\_\_\_\_  
**Dr.-Ing. Ashok Kumar Nallathambi** **Dr. S.P.Sivapirakasam**

#### **Guidelines:**

- a) The number of assessments for a course shall range from 4 to 6.
- b) **Every course shall have a final assessment on the entire syllabus with at least 30% weightage.**
- c) **One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered. Details of compensation assessment to be specified by faculty.**
- d) **The passing minimum shall be as per the regulations.**
- e) **Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.**
- f) **Absolute grading policy shall be incorporated if the number of students per course is less than 10.**
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.